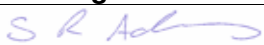
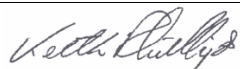


**DIGITAL RADIOGRAPHY
EN4179 LEVEL 2 SYLLABUS**

DOCUMENT APPROVAL			
Function	Name	Signature	Date
Senior NDT Instructor	Scott Adams		06/03/2024
RL3 Testia Ltd	KEITH PHILLIPS		06/03/2024

General Theory

Instruction shall be given in the principles, limitations and theoretical aspects of the following:

- Introduction – The structure of the atom. The nature of X-rays and Gamma rays. The properties of X-rays. Radiographic parameters. Filters. The X-ray tube. The mechanism of interaction. Attenuation of radiation. The inverse square law. Scatter.
- The production of X-rays – Introduction. The Benson focus principle. The electrical operation of an X-ray tube and control panel. The X-ray continuous spectrum.
- Concepts of digital radiography – Basic concepts of digital radiography. Bit depth. Dynamic range. Pixels. Pixel size. Pixel pitch. Compression: Lossless versus lossy. File formats. DICOM. Data storage. Image display.
- Digital image processing – Digital radiography image processing and analysis. Region of interest and measurements. Measurements. Grayscale display adjustments. Thresholding. Histogram Equalisation. Pseudo colour. Filtering (Kernels). Bad pixels.
- Digital radiographic hardware – Digital detectors. Detector efficiency. Film digitisation. Digital detector arrays. Linear detector array. Storage phosphor image plates.
- Image analysis – Image analysis. Spatial resolution considerations. Gain offset correction.
- Other methods – Introduction. Real time radiography. Gamma radiography. Types of isotopes. Filmless radiography. Neutron radiography. Electron radiography. Computerised radiography. Backscatter or Compton imaging.

**DIGITAL RADIOGRAPHY
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Instruction shall be given in the following:

- Exposure factors; Radiation quality; Effects of changing kV; Significance and effect of types of Gamma and X ray source; Effect of time, milli-amperage and FFD on exposure; Use of exposure charts; Identification, marking out and setting up.
- Techniques – Factors influencing radiographic techniques including masking, blocking media, screens, filters and imaging plate types; The use of IQI's and duplex pairs; Determination of focal spot size, multi-film and panoramic techniques; Assessment of depth of known defects.
- Radiographic quality assessment; Judging quality of processed plates taking into account codes, standards, specifications, procedures and techniques; Calculation of IQI sensitivity; Methods of reporting; determination of grey scale value; Radiographic appearance of discontinuities including adventitious images, their causes and effects; Viewing conditions; optimum viewing conditions, masking, reduction of external lighting and viewing angle.
- Sector specific aerospace product technology theory – The depth of knowledge required will be such that the candidate will be capable of understanding the description of potential defects and their likely locations as specified in NDT instructions and procedures; Describing unambiguously in NDT reports, the nature and location of what has been found such as the non-NDT engineer can gain an accurate appreciation of the condition of the inspected area.

Reference material

- ASNT – Study guide
- EN/ISO 14096 – Film digitisation
- EN 14784 1 and 2 - Industrial CR with storage phosphor imaging plates. Classification of systems and general principles of application
- EN 444 – General principles for radiographic examination